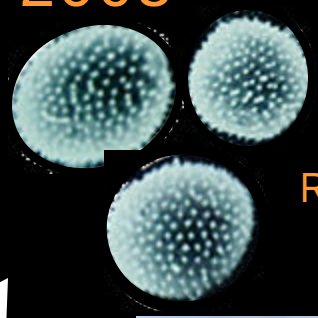
Soybean Rust

Coanne E. O'Hern, USDA-APHIS-PPQ-PDMP
National Survey Coordinator; CAPS Program

Modeling as a Support Tool for Managing Soybean Rust in 2005



Roger Magarey (CPHST/APHIS), Joe Russo (ZedX) and Scott Isard (Penn State)

In 2002:

- 355,000 U.S farms grew soybean
- 72.1 M acres of soybean were harvested
- 23% of harvested crops were soybean

USDA ERS

10% yield losses are possible in any U.S. soybean-growing region (Yang 1996). Expected value of net economic losses will range from $640 M to $1.3 B in the first year of the pathogen's establishment (USDA ERS April 2004).

APHIS

ZedX, Inc.

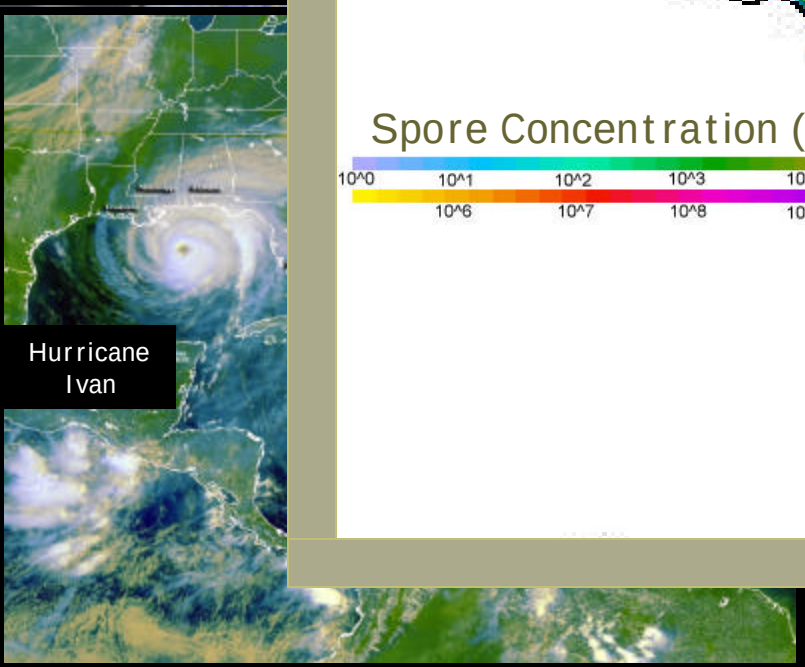
Aerobiological Risk Analysis for Soybean Rust

A project funded by APHIS to examine the risk of the aerial incursion of soybean rust into North America.

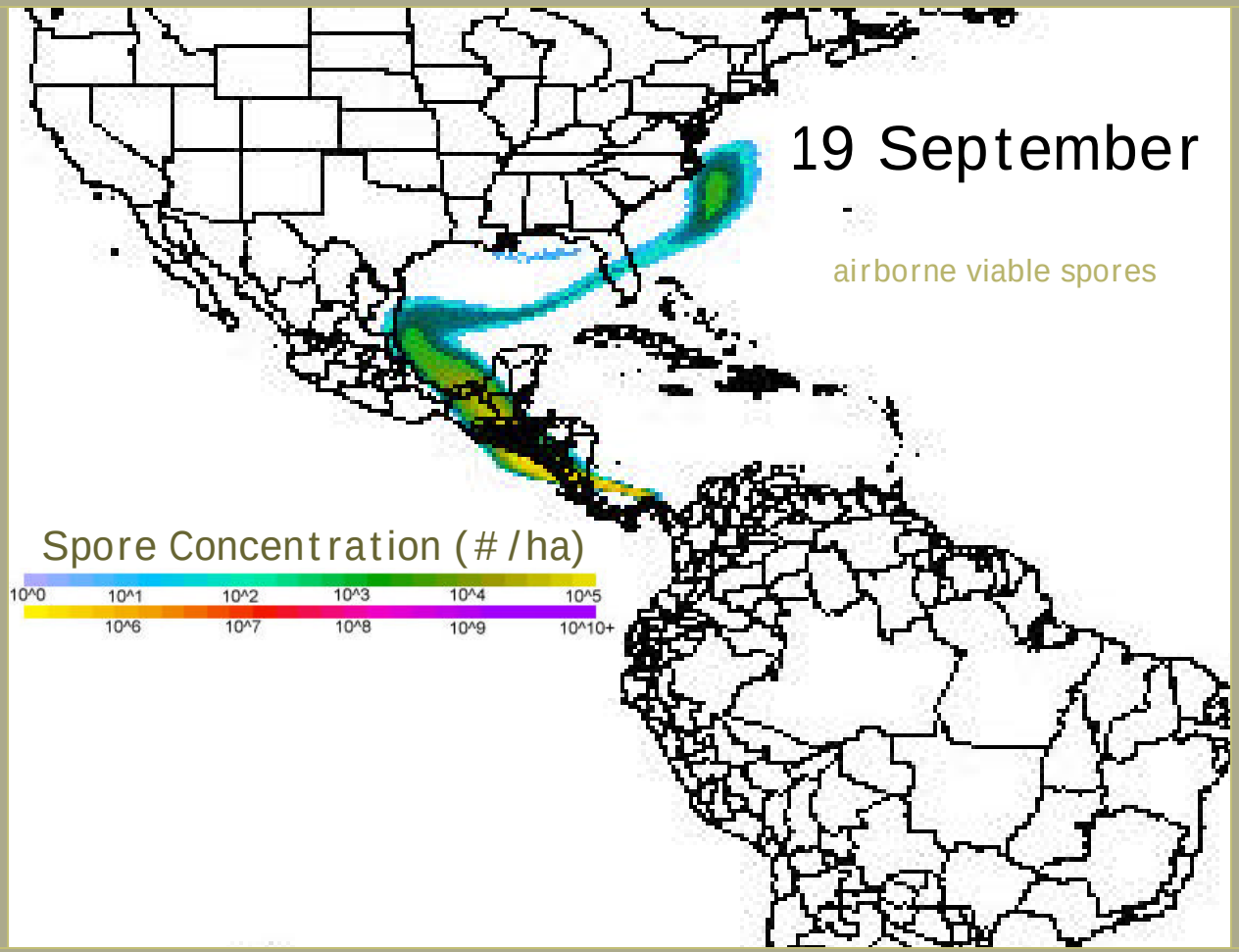
PENNSTATE

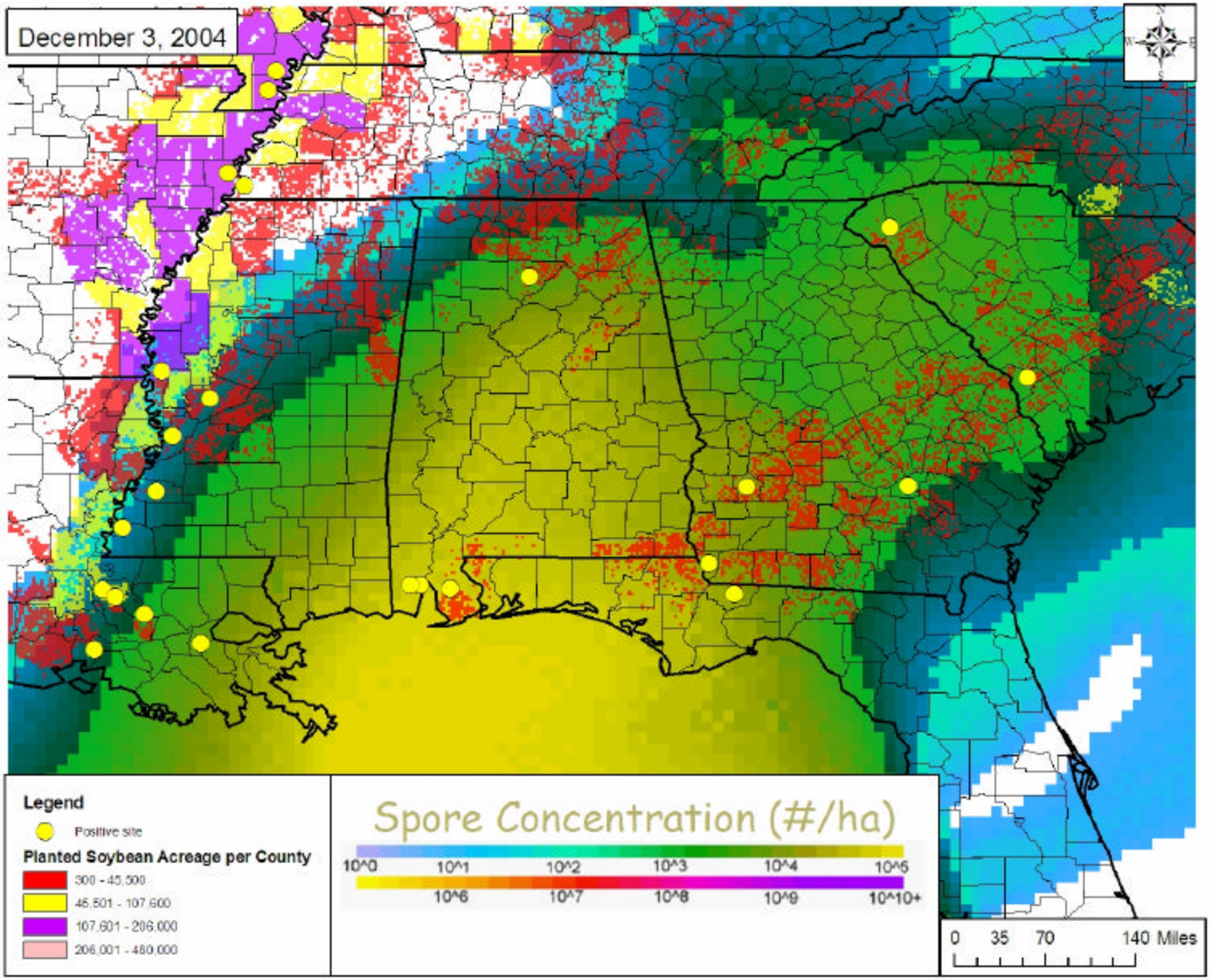
ILLINOIS

NC STATE UNIVERSITY



Hurricane Ivan




December 3, 2004
Legend
Positive site
Planted Soybean Acreage per County
300 - 45,500
45,501 - 107,600
107,601 - 206,000
206,001 - 480,000
Spore Concentration (#/ha)
10^0
10^1
10^2
10^3
10^4
10^5
10^6
10^7
10^8
10^9
10^10+
0 35 70 140 Miles

Soybean Rust Activity Flow

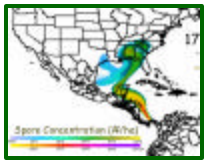
From Planning to Management

Planning

Training

Education

Research



Modeling

Monitoring & Scouting

Information Dissemination

Management

USDA

University

Industry

Grower

Consultants

Distributor

USDA Soybean Rust Response Plan

1. Decision criteria for fungicide application
2. Web-based decision support system
3. Predictive models
4. SBR Surveillance and Monitoring Network

Soybean Rust Plan

- Protection
- **Detection**
  - Detection Survey
    - Soybean Rust Host List
    - Collection of Specimens
- Response
- Recovery

Soybean pest survey, including SBR- MS, OH, VA, WI, PA, FL, IL, HI, TX

Soybean Rust Plan

- Protection
- Detection
- Response
  - Identification Procedures
    - Identification Characters
    - Diagnostic Laboratory Instructions
- Recovery

Soybean Rust Plan

- Protection
- Detection
- **Response**
  - Incident Coordination
  - Communications
    - National
    - Local
  - Technical Support
    - Incident Assessment
    - Surveillance
    - Management
    - Forecasting
- Recovery

Surveillance/Monitoring

- 5 components
  - Sentinel program
  - Industry surveys
  - Mobile surveys
  - NPDN data
  - International monitoring

URL: http://www.aphis.usda.gov/

Click on “Hot Issues” and then “Soybean Rust”

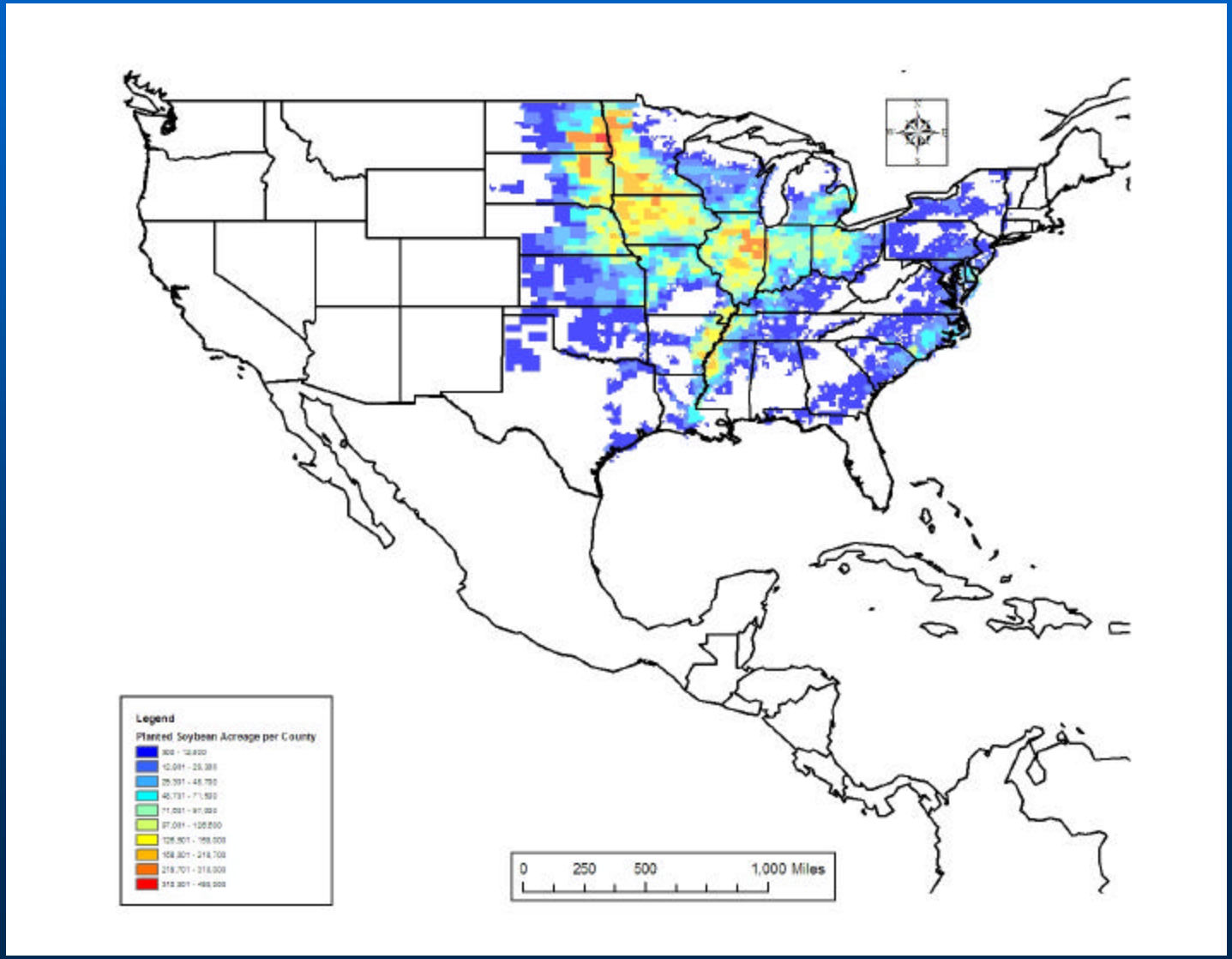
Soybean Rust Plan

- Protection
- Detection
- Response
- Recovery
  - Technical Support
    - Forecasting Systems
    - Access to Fungicides
    - Resistant/Tolerant Varieties
  - Outreach

Model Support for Soybean Rust Management in the 2005 Season

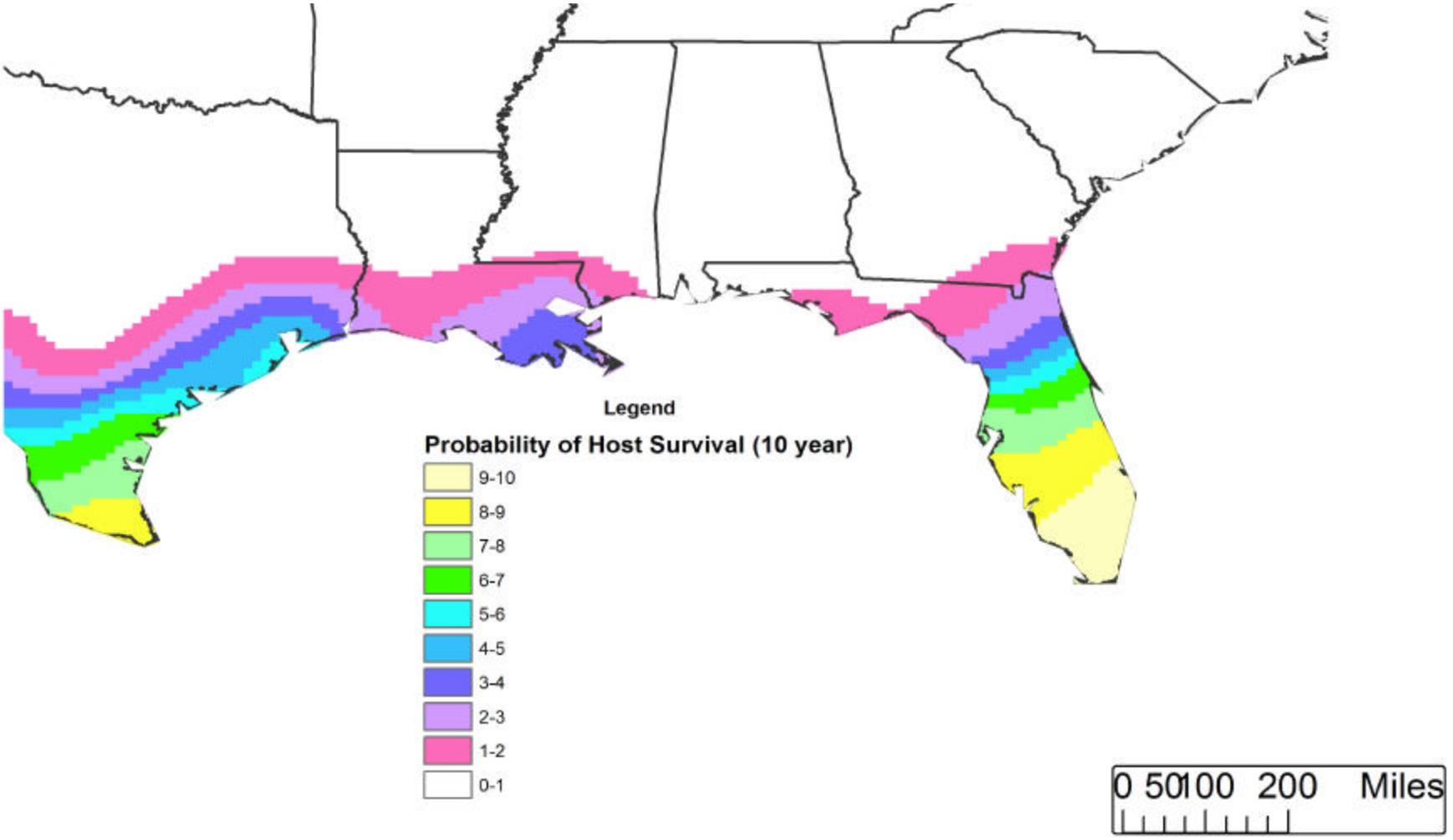
1. Overwintering areas
2. Seasonal “Greening”
3. Transport pathways
4. Epidemic development
5. Economic assessment
6. Disease analogs for spread

US Planted Soybean Acreage per County

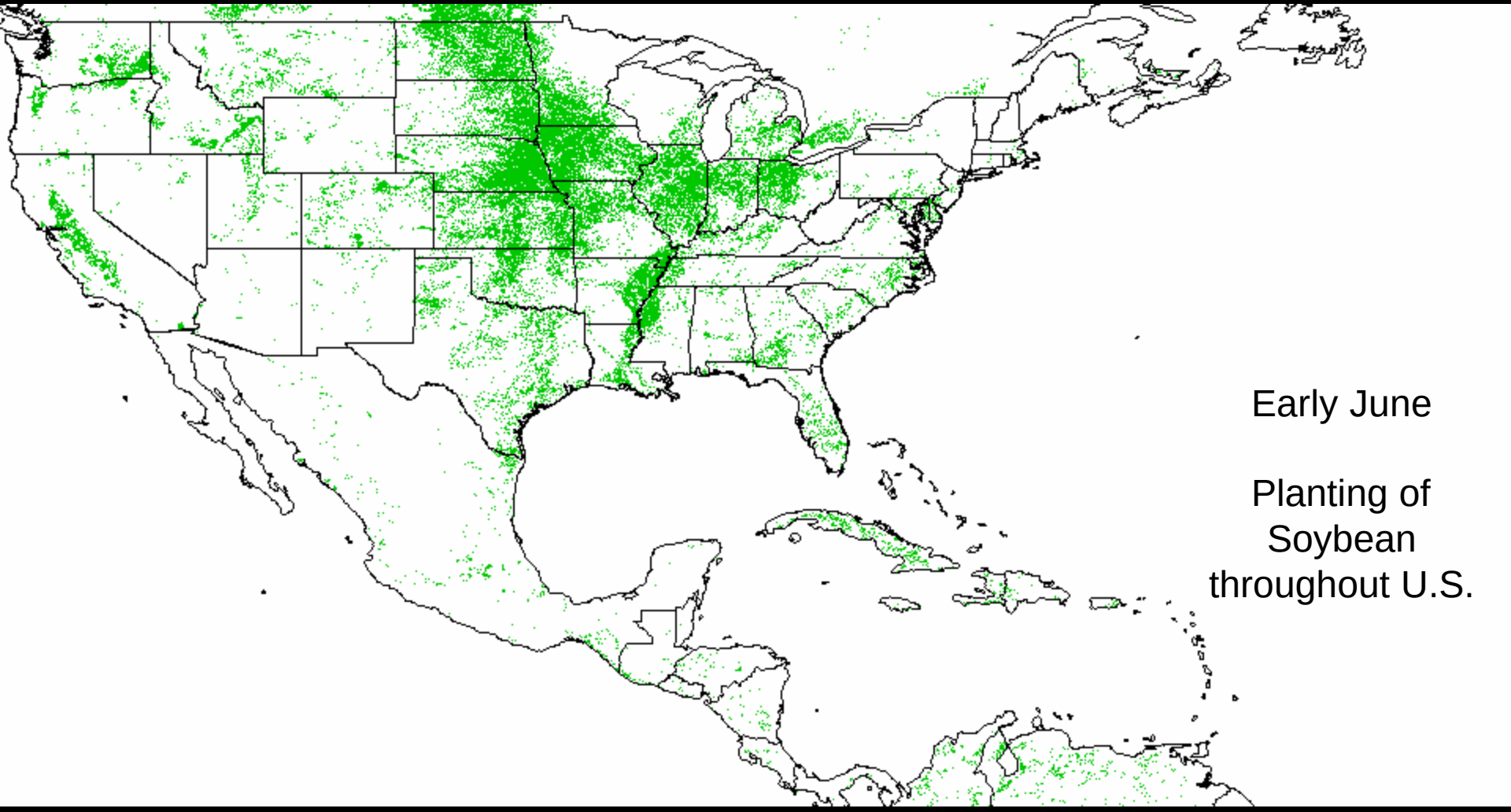


Overwintering Potential of Leguminous Hosts

Probability for survival of overwintering hosts based on occurrence of temperatures greater than 28º F in a given year using 10-year daily climate data interpolated to a 10km^2 resolution.



The “Greening” of Soybean Rust Hosts in North America



Acknowledgements

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